

SOME NEGLECTED SETÆ OF LEPIDOPTEROUS LARVÆ.

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A study of the corn-ear worm larva with reference to its external structure* has revealed series of microscopic setæ, some of which appear to have been overlooked by other writers when dealing with the Noctuidæ and are thus not recognized in the systems employed, though they are as constant in every way as the larger setæ to which numbers, or Greek letters, have been assigned. As opportunity arose the author has examined larvæ of other families of moths and finds the same setæ present, though showing some variations with family, in their numbers, in position on the body, and in their relation to each other and to certain of the large setæ. As examples of these variations I am presenting figures made from greatly enlarged photographs of the skins of one of the Cossidæ, *Prionoxystus robinicæ*, the well known Carpenter worm of black locust trees, and of *Tholeria reversalis*, one of the Pyralidæ.

The body of the carpenter worm when about half grown bears round brownish tubercles upon which the setæ arise, the pigment of the tubercles serving as a guide in locating the setæ and enabling one to find with no special difficulty even the smallest of them. This larva bears six large setæ on each side of its neck plate, and one microscopic seta at the posterior edge of each half, the latter being the homolog of the one noted on the neck plate of Chloridea. The neck plate bears also on each side three sense pores, the lateral one minute, and a gland outlet outside and a trifle posterior to seta *IIA*. A ventral microscopic seta is present on the prothorax anterior to the base of the jointed leg, and a second just in front of the base.

The mesothorax and metathorax are alike in the number and arrangement of setæ. A single microscopic seta is present at the anterior edge nearly in line with seta *IIB* of the neck plate. Exterior to these setæ, in line with the ventral sense pore of the neck plate, is on both meso- and metathorax a pair of microscopic setæ; otherwise the microscopic setæ are like those of the prothorax. The fourth body somite (1st abdominal) bears a seta at its anterior edge, in line with the one on the thoracic somites, but lacks the lateral pair of microsetæ as does also the succeeding abdominal somites, but the microscopic seta *IIIA* appears before the spiracle as an independent seta. The more

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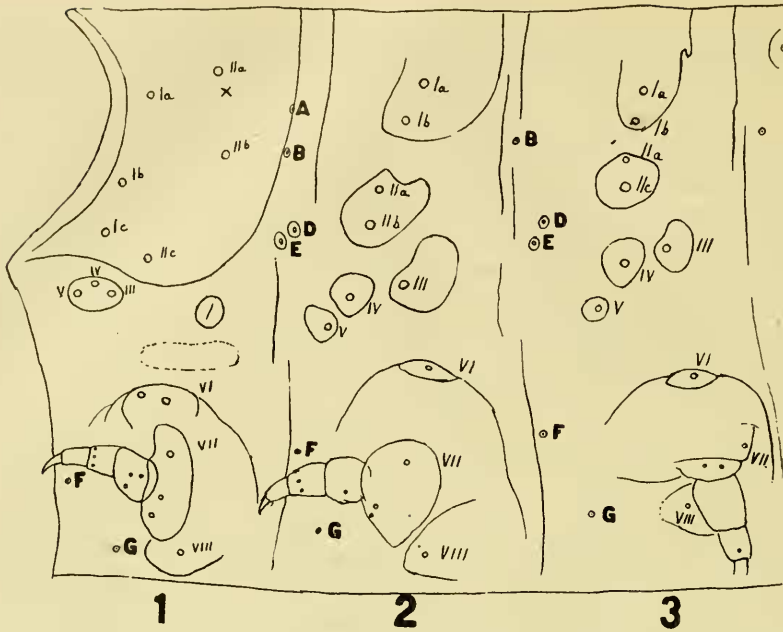


Fig. 1. Left side of larva of *Prionoxystus robiniae*, showing the three thoracic somites. Sockets of large setae (and IIIa) numbered by Dyar's system. Microscopic setae indicated by letters. Gland of neck plate indicated by x.

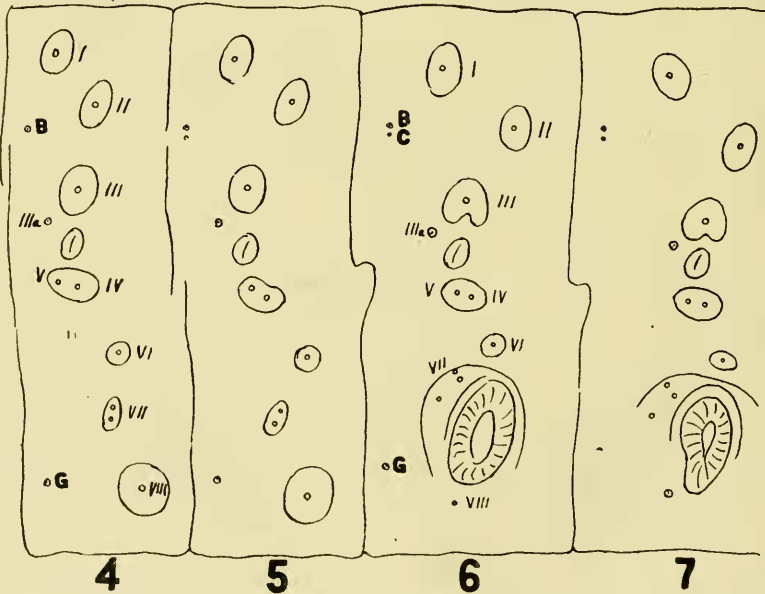


Fig. 2. Left side of larva of *Prionoxystus robiniae*, showing body somites 4 to 7, inclusive (abdominal somites 1 to 4, inclusive). Letters and numbers as in Fig. 1.

dorsal of the two ventral microscopic setæ of the thorax disappears, and is lacking also on succeeding abdominal somites.

The fourth body somite (2nd abdominal) bears a pair of microscopic setæ in the dorsal series, the outermost vestigial; and on all following somites to and including the 12th body (9th abdominal) this pair is present, the two becoming somewhat widely separated on the 11th and 12th.

The larva of *Tholeria reversalis* has been taken in some numbers on several occasions from Laburnum in nurseries in Kentucky. It is a particularly fine larva for the study of setæ, because the bristles are borne on dense black, often angular, plates, and can be even more readily located than in the larva of *Prionoxystus robinia*. The same number (6) of macroscopic setæ is present on the neck plate, with three sense pores, as in Noctuidæ and Cossidæ. A microscopic seta is present at the posterior edge of the neck plate. The microscopic setæ of the meso- and metathorax are as in *Prionoxystus*, except that the pair is mounted on a pinaculum on each of these somites, the plates having apparently united. The dorsal series of microscopic setæ consists of a single seta near the anterior margin of somites 4 to 12 inclusive. The microscopic seta IIIa is in this larva associated on a hammer-shaped plate with the larger seta III, and is to be recognized on body somites 4 to 11 inclusive. The presence of IIIa with III on a pinaculum is a feature in which it agrees with *Hepialus* and certain Tortricids and differs from *Prionoxystus*.

A singular dermal gland with contorted chitinous efferent tubule opens on each side just posterior and a trifle ventral to the dorsal microscopic seta, on body somites 2 to 11 inclusive. Each efferent tube opens by a funnel-shaped enlargement in the cuticle. One of these glands and tubes opens also in the neck plate, and one in the base of each jointed leg. These are probably glands of the same nature as those described by E. Verson (See Packard's Text Book of Entomology) and said to give off oxalate of lime at an early stage, and later, uric acid. But it seems unlikely that special excretory organs are needed in this larva and not also in Noctuidæ. They have not at any rate been observed in Chloridea. In *Prionoxystus* there is a small aperture outside seta IIIa of the neck plate, that probably represents these glands. It is liable to be mistaken for a fourth sense pore. The glands may produce some defensive excretion, but the efferent ducts are suggestive of the nephridia of Annelids, and it may prove that they are accessory renal organs as has been suggested. In the figures, the outlets of these glands are marked by an x.

The large setæ that have received numbers according to Dr. Dyar's system are indicated by these numbers in accompanying drawings, the homologies being determined by comparison of the photographs with figures published by Mr. Carl Heinrich* and made from larvæ of the same family in each case. In my own figures the microscopic setæ not represented by Mr. Heinrich are indicated by letters.

* Proc. U. S. Nat. Mus., Vol. 57, pp. 53-96, 1920.

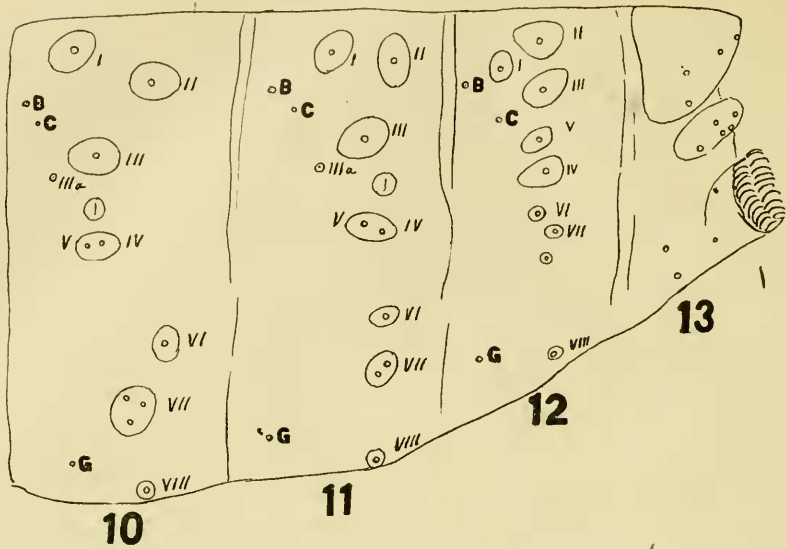


Fig. 3. Left side of larva of *Prionoxystus robiniae*, showing body somites 10 to 13, inclusive. Letters and numbers as in Figs. 1 and 2.

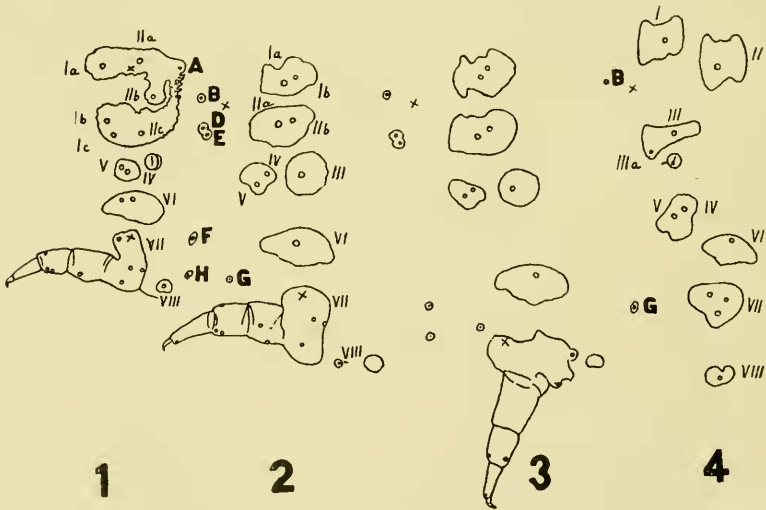


Fig. 4. Left side of larva of *Tholeria reversalis*, showing body somites 1 to 4, inclusive. Letters and numbers as in Figs. 1-3. Location of dermal glands marked by x.

It is evident from an examination of these larvæ that Dr. Dyar's numbers will some time require rearrangement so as to include in their appropriate places all of the setæ now known to be present on the bodies of lepidopterous larvæ.

The microscopic setæ must be considered in any complete system showing the chaetotaxy of our species. They are clearly a long-established feature of the structure of many families, and their vestigial character appears to denote some change in the integument of somites the nature of which we do not at present understand. Some or all of the setæ appear even among the confusing development of secondary setæ in such families as Arctiidae and Notodontidae. On the larva of



Fig. 5. Left side of larva of *Tholeria reversalis*, showing body somites 9 to 13, inclusive.

Acrolophus mortipenellus (Acrolophidae) the paired setæ (D. and E. of my Figures) of the thorax are borne by a sclerite of some size, not different from those bearing the large setæ. The minute seta (A) of the neck plate is present in most of our families of moths. Seta IIIa is also generally present, though it has often been overlooked.* The others when sought out have proved not less constant, and once their location on the body is known, one can on a large number of our genera count with certainty on finding them when this portion of the cuticle is brought under the microscope.

* It does not, however, always bear the same relation to III even in the same subfamily. Thus in *Tholeria reversalis* it is associated with III, but in *Desmia uneralis* it is independent.